

WHAT IS CLAIMED IS:

1. An information recording medium comprising:  
a substrate; and  
a print pattern formed on the substrate and

5 containing

a first colorant which changes at least one  
property selected from the group consisting of a color  
and a dielectric constant of the first colorant upon  
application of a first electromagnetic field having a  
10 first intensity, and

a second colorant which behaves differently  
from the first colorant upon application of the first  
electromagnetic field.

2. The medium according to claim 1, wherein the  
15 first colorant changes the color upon application of  
the first electromagnetic field, and the second  
colorant maintains a color of the second colorant  
unchanged independently of the intensity of an  
electromagnetic field applied.

- 20 3. The medium according to claim 1, wherein the  
first colorant changes the color upon application of  
the first electromagnetic field, and the second  
colorant maintains a color of the second colorant  
unchanged upon application of the first electromagnetic  
25 field and changes the color of the second colorant upon  
application of a second electromagnetic field having  
a second intensity higher than the first intensity.

4. The medium according to claim 1, wherein the first colorant changes the color of the first colorant upon application of the first electromagnetic field, the second colorant changes a color of the second colorant upon application of the first electromagnetic field, and a time required for the first colorant to change the color of the first colorant after application of the first electromagnetic field differs from a time required for the second colorant to change the color of the second colorant after application of the first electromagnetic field.

5. The medium according to claim 1, wherein the first colorant changes the dielectric constant of the first colorant upon application of the first electromagnetic field, and the second colorant maintains a dielectric constant of the second colorant unchanged upon application of the first electromagnetic field.

6. The medium according to claim 1, wherein the first colorant containing liquid crystal microcapsules each comprising a liquid crystal material and a film encapsulating the liquid crystal material.

7. The medium according to claim 6, wherein the liquid crystal material contains a dichroic dye.

8. The medium according to claim 7, wherein the second colorant contains liquid crystal microcapsules each comprising a liquid crystal material containing

a dichroic dye and a film encapsulating the liquid crystal material.

5 9. The medium according to claim 8, wherein an average grain size of the liquid crystal microcapsules in the first colorant differs from an average grain size of the liquid crystal microcapsules in the second colorant.

10 10. The medium according to claim 1, wherein a surface of the substrate to which the print pattern is provided is conductive, and the medium further comprises a transparent electrode which faces the conductive surface of the substrate with the print pattern sandwiched therebetween.

15 11. The medium according to claim 1, wherein the print pattern comprises a first pattern containing the first colorant and a second pattern containing the second colorant.

20 12. The medium according to claim 11, wherein the first and second patterns form at least one pattern selected from the group consisting of a bar code pattern and a dot matrix pattern.

25 13. A method of reproducing information recorded on an information recording medium, which comprises a substrate and a print pattern formed on the substrate and containing a first colorant which changes at least one property selected from the group consisting of a color and a dielectric constant of the first colorant

upon application of a first electromagnetic field  
having a first intensity and a second colorant which  
behaves differently from the first colorant upon  
application of the first electromagnetic field,  
5 comprising:

reproducing the information by applying an  
electromagnetic field to the medium.

14. The method according to claim 13, wherein

10 the first colorant changes the color of the first  
colorant upon application of the first electromagnetic  
field, and the second colorant maintains a color of the  
second colorant unchanged upon application of the first  
electromagnetic field, and

15 the reproduction of the information comprises  
applying the first electromagnetic field to the medium,  
thereby developing an image  $I_{g1}$  different from an image  
 $I_{g0}$  maintained when no electromagnetic field is  
applied.

15. The method according to claim 14, wherein

20 the second colorant changes the color of the  
second colorant upon application of a second  
electromagnetic field having second intensity higher  
than the first intensity, and

25 the reproduction of the information comprises  
applying the second electromagnetic field, thereby  
developing an image  $I_{g2}$  different from the image  $I_{g0}$   
and the image  $I_{g1}$ .

16. The method according to claim 13, wherein  
the first colorant changes the color of the first  
colorant upon application of the first electromagnetic  
field, the second colorant changes a color of the  
5 second colorant upon application of the first  
electromagnetic field, and a time required for the  
first colorant to change the color of the first  
colorant after application of the first electromagnetic  
field differs from a time required for the second  
10 colorant to change the color of the second colorant  
after application of the first electromagnetic field,  
and

the reproduction of the information comprises  
applying the first electromagnetic field to the medium,  
15 thereby sequentially developing an image  $I_{gt1}$  different  
from an image  $I_{g0}$  maintained when no electromagnetic  
field is applied and an image  $I_{gt2}$  different from the  
image  $I_{g0}$  and the image  $I_{gt1}$ .

17. A method of discriminating an information  
20 recording medium, which comprises a substrate and  
a print pattern formed on the substrate and whose  
genuineness is unknown, between a counterfeit  
information recording medium and a genuine information  
recording medium which comprises a substrate and a  
25 print pattern formed on the substrate and contains a  
first colorant which changes at least one property  
selected from the group consisting of a color and a

dielectric constant of the first colorant upon  
application of a first electromagnetic field having a  
first intensity and a second colorant which behaves  
differently from the first colorant upon application of  
5 the first electromagnetic field, comprising:

applying an electromagnetic field to the medium  
whose genuineness is unknown.

18. The method according to claim 17, wherein

10 the first colorant changes the color of the first  
colorant upon application of the first electromagnetic  
field, and the second colorant maintains a color of the  
second colorant unchanged upon application of the first  
electromagnetic field, and

15 the method further comprises comparing an  
image  $I_{g1}$  on the genuine medium when the first  
electromagnetic field is applied with an image  $I_{x1}$  on  
the medium whose genuineness is unknown when the first  
electromagnetic field is applied.

19. The method according to claim 17, wherein

20 the first colorant changes the color of the first  
colorant upon application of the first electromagnetic  
field, and the second colorant maintains a color of the  
second colorant unchanged upon application of the first  
electromagnetic field, and

25 the method further comprises comparing an image  
 $I_{x0}$  on the medium whose genuineness is unknown when no  
electromagnetic field is applied with an image  $I_{x1}$  on

the medium whose genuineness is unknown when the first electromagnetic field is applied.

20. The method according to claim 17, wherein

5 the first colorant changes the color of the first colorant upon application of the first electromagnetic field, and the second colorant maintains a color of the second colorant unchanged upon application of the first electromagnetic field and changes the color of the second colorant upon application of a second  
10 electromagnetic field having a second intensity higher than the first intensity, and the method further comprises:

15 comparing an image  $I_{x1}$  on the medium whose genuineness is unknown upon application of the first electromagnetic field with an image  $I_{g1}$  on the genuine medium upon application of the first electromagnetic field.

21. The method according to claim 17, wherein

20 the first colorant changes the color of the first colorant upon application of the first electromagnetic field, and the second colorant maintains a color of the second colorant unchanged upon application of the first electromagnetic field and changes the color of the second colorant upon application of a second  
25 electromagnetic field having a second intensity higher than the first intensity, and the method further comprises:

comparing an image  $I_{x2}$  on the medium whose genuineness is unknown upon application of the second electromagnetic field with an image  $I_{g2}$  on the genuine medium upon application of the second electromagnetic field.

22. The method according to claim 17, wherein

the first colorant changes the color of the first colorant upon application of the first electromagnetic field, the second colorant changes a color of the second colorant upon application of the first electromagnetic field, and a time  $t_1$  required for the first colorant to change the color of the first colorant after application of the first electromagnetic field is shorter than a time  $t_2$  required for the second colorant to change the color of the second colorant after application of the first electromagnetic field, and the method further comprises:

comparing an image  $I_{xt1}$  on the medium whose genuineness is unknown after a time  $t_3$  has elapsed from application of the first electromagnetic field, the time  $t_3$  being not less than the time  $t_1$  and less than the time  $t_2$ , with an image  $I_{gt1}$  on the genuine medium after the time  $t_3$  has elapsed from application of the first electromagnetic field.

23. The method according to claim 17, wherein

the first colorant changes the color of the first colorant upon application of the first electromagnetic



field, the second colorant changes a color of the second colorant upon application of the first electromagnetic field, and a time  $t_1$  required for the first colorant to change the color of the first colorant after application of the first electromagnetic field is shorter than a time  $t_2$  required for the second colorant to change the color of the second colorant after application of the first electromagnetic field, and the method further comprises:

comparing an image  $I_{xt2}$  on the medium whose genuineness is unknown after a time  $t_4$  has elapsed from application of the first electromagnetic field, the time  $t_4$  being not less than the time  $t_2$ , with an image  $I_{gt2}$  on the genuine medium after the time  $t_4$  has elapsed from application of the first electromagnetic field.

24. The method according to claim 17, wherein

the first colorant changes the color of the first colorant upon application of the first electromagnetic field, the second colorant changes a color of the second colorant upon application of the first electromagnetic field, and a time  $t_1$  required for the first colorant to change the color of the first colorant after application of the first electromagnetic field is shorter than a time  $t_2$  required for the second colorant to change the color of the second colorant after application of the first electromagnetic field,

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comparing an image  $I_{gt1}$  on the genuine medium after a time  $t_3$  has elapsed from application of the first electromagnetic field, the time  $t_3$  being not less than the time  $t_1$  and less than the time  $t_2$ , an image  $I_{gt2}$  on the genuine medium after a time  $t_4$  has elapsed from application of the first electromagnetic field, the time  $t_4$  being not less than the time  $t_2$ , and an image  $I_{g0}$  on the medium whose genuineness is unknown when no electromagnetic field is applied.